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SIGHT-SAVING CLASSES IN THE PUBLIC SCHOOLS

BY

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SUPERVISOR, DEPARTMENT FOR THE BLIND
CLEVELAND PUBLIC SCHOOLS



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FOREWORD

THE publication of this Bulletin is made possible through the generous support of Mr. Murray Seasongood, '00, of Cincinnati, Chairman of the Schools Committee of the Associated Harvard Clubs.

Readers of this monograph will be interested to know that the author, Mr. R. B. Irwin, himself blind, is to be one of the lecturers in an extension course on the Education of the Blind, undertaken in 1920 by the Graduate School of Education, Harvard University, with the coöperation of the Massachusetts Department of Education, Division of the Blind, the Perkins Institution for the Blind, and the Association for the Promotion of the Interests of the Adult Blind. Inquiry concerning this course may be addressed to the Graduate School of Education, Lawrence Hall, Cambridge, Massachusetts.

INTRODUCTION

LIKE a shaft of sun penetrating their twilight has come the Sight Saving Class to our visually handicapped school children.

Parents, educators, in fact the general public look upon all children who are not definitely blind as having normal eyesight. Only the few who have had the fact forcibly brought to their attention realize the existence of a third group — the children whose light is darkened. So, little ones whose eyesight is reduced to one-third, one-quarter, or even a tenth of normal are required with the same equipment to meet the standards reasonably demanded of the unhandicapped child.

The Sight Saving Class seems the reasonable solution for these most unfortunate of children. Probably no one knows this subject better than Mr. Irwin who has been associated with the work practically since its beginning and has also known schools for the blind since his early childhood. He tells us concisely the causes of visual disability in school children and the methods for overcoming their impediment.

These classes for conservation of vision are slowly but steadily becoming established in our larger cities. The improvement in general physical condition and scholarship justifies the trouble and additional expense incurred in conducting these special classes.

IDA E. RIDGEWAY,
*Supervisor of Work for Children,
Massachusetts Department of Education,
Division of the Blind.*

SIGHT-SAVING CLASSES IN THE
PUBLIC SCHOOLS

SIGHT-SAVING CLASSES IN THE PUBLIC SCHOOLS

SCHOOL medical inspection has disclosed the existence in every school population of a certain proportion of pupils who, though not blind, are seriously handicapped in their school work by reason of marked defects of vision. These pupils can read ordinary school books, but any continued use of such material is attended by so much strain of the eyes and general nervous system as to jeopardize their sight and general health. The operation of our compulsory education laws has brought these pupils forcibly to the attention of school and health authorities.

Eye defects in such cases are as follows: (1) those which cause a considerable dimness of vision, but which are more or less static in nature, such as scars or opaque spots on the cornea or transparent part of the eye; (2) those which do not cause a marked reduction in visual power, but which grow progressively worse under unfavorable conditions, such as progressive myopia, or near-sight, which is likely to result in the tearing away of the inner and most important part of the wall of the eye, the retina or nerve layer. The proportion of pupils having such visual defects varies in different places from one to every five hundred of the school population in the smaller cities to one to one thousand of the school population in the larger cities. While the number of such pupils is small, it is two or three times as large as is the number of blind children. Furthermore, our neglect of this class has made it a fruitful field from which to recruit the ranks of the blind in later life.

Many of these pupils have had a hopeless prospect in the past. Some of them who have had the good fortune to fall in with considerate teachers and who have had wise parents have managed to get through school with few ill effects. Others have worried along, always at the foot of the class, repeating every other year, study-

ing when their eyes would permit, bluffing when their eyes would not, idling away their time, and when their self-respect asserted itself, playing truant. Some of these pupils eventually drop out of school either with or without a doctor's certificate. Other pupils of this class sooner or later find their way into a school for the blind. In such schools they are no less misfits than they are in the regular classes in the public schools. Schools for the blind accept them, not because it is felt that they belong in such institutions, but because there seems to be no other place to send them.

In the school for the blind the approach is through the fingers. Every pupil must learn to read by touch. At first, these "seeing" pupils make a serious effort to coöperate with the teachers, but the process of finger reading is so clumsy, and reading with the eyes is so easy that they soon supplement touch with sight. From this time forward, it becomes a test of persistence between the teacher and the pupil, in which the child generally wins. In time the teacher comes to wink at the practice of reading the raised white dots by sight. Eventually many of these pupils appear in class with an ink print book from which they read openly.

Naturally schools for the blind give little attention to the proper source and quantity of schoolroom lighting. In one of our best residential schools for the blind every classroom has a southern exposure. These rooms are flooded most of the day with bright sunshine which produces a glare intolerable to the child with weak eyes. Other schools for the blind have a very inadequate supply of natural light, and practically no artificial light is provided. Consequently many of those who enter the school for the blind with considerable sight read with their fingers cheerfully before they graduate as they have no other means of reading.

Early in the second decade of the twentieth century, interest in the problem of adapting public school methods to the needs of pupils with a high degree of visual defect was manifested not only in several parts of the United States, but also in England and in Germany. Although the class opened in London at the instigation of M. Bishop Harmon in 1909 was primarily for the treatment of myopic patients, an increasing percentage of pupils with



READING BRAILLE WITH WEAK EYES CAUSES DANGEROUS EYE-STRAIN

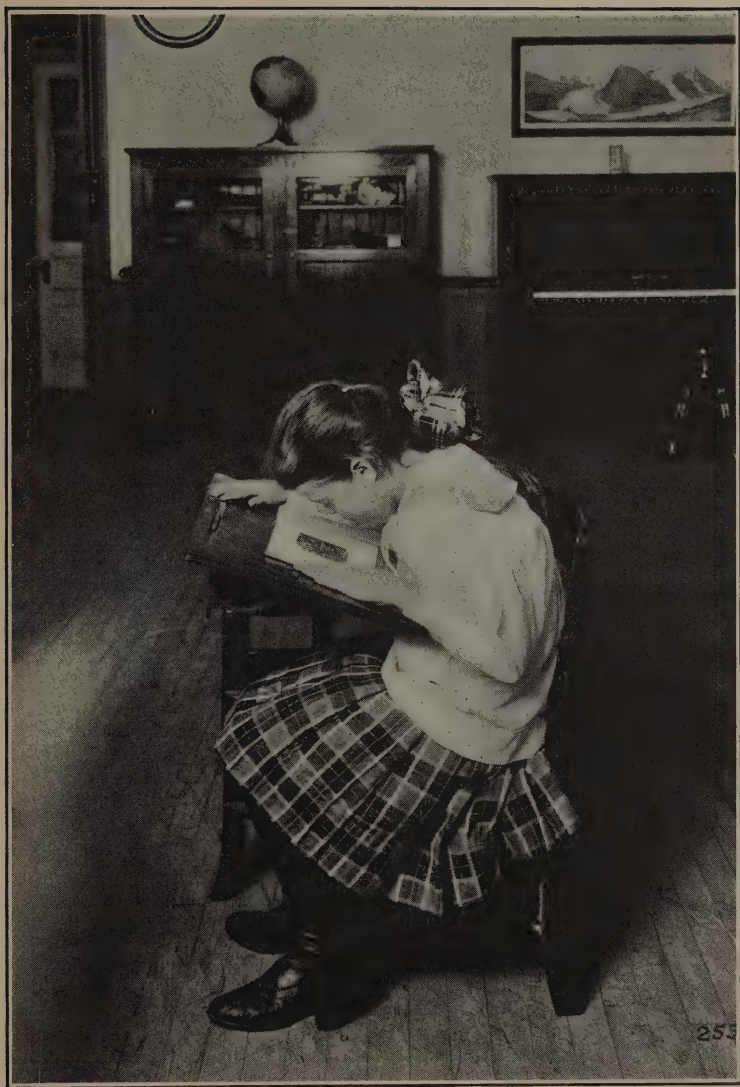
other visual defects has been admitted in order to aid them in their school work.

In 1911 pupils having considerable vision who had been assigned to classes for the blind in Cleveland were permitted to make a moderate use of the blackboard and of school text-books under the direct supervision of the school oculist.

In the spring of 1913, the city of Boston opened a class for so-called "semi-seeing" children. This step was taken at the urgent request of the Perkins Institution for the Blind which continued for years to extend to these classes and other similar classes in Massachusetts much financial and moral support.

In the fall of 1913, the city of Cleveland removed from its classes for the blind all pupils who had been taught through their eyes rather than through their fingers, and organized them into special classes known as conservation of vision or sight-saving classes. A little later Cincinnati, Toledo, and several other Ohio cities opened up similar classes. During the same period several Massachusetts cities followed the lead of Boston and made similar provision for their pupils with defective vision. New York City opened a few of these classes as an experiment, and soon became so flooded with applicants that those in charge of the department almost despair of meeting the demand. Recently Detroit, Grand Rapids, Minneapolis, Duluth, Rochester, Buffalo, Philadelphia, Halifax, Nova Scotia, and other cities have organized conservation-of-vision classes. Milwaukee has adopted the special method of instruction used in sight-saving classes, but as yet has not separated the partially sighted from those who are blind.

Few innovations in educational methods have met with so much universal approval as has the separation for instruction purposes of blind and partially blind pupils. Schools for the blind, state commissions for the blind, city societies for the blind, and the National Committee for the Prevention of Blindness have promoted this movement with energy and enthusiasm. Illinois, Massachusetts, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin have enacted state laws providing financial assistance to cities conducting such classes.



UNRESTRICTED READING IN THIS WAY IS NOT ONLY PAINFUL BUT
DANGEROUS

Sight-saving class departments have three fairly definite aims: first, to instruct the pupils with a minimum of eye-strain; second, to teach them how to conserve the vision they possess; and, third, to provide such vocational guidance, and, if necessary, vocational training as will enable them to fill the most useful places in the community their powers will permit.

The most common method of procedure in establishing a sight-saving class is to designate a public school building as a conservation-of-vision school. To this building are assigned eight or ten children seriously handicapped in regular school work by reason of defective vision. They possess sufficient sight, however, to enable them to make some use of ordinary book print. In developing this work, care is usually taken not to set these children apart from others any more than is necessary. The regular organization of the school is disturbed as little as possible, and not more than twelve pupils are assigned to any one building.

In buildings designated as conservation-of-vision schools, a room is set aside for the use of children with defective eyesight. A teacher is placed in charge of the room whose function it is to assist these children to keep pace with the boys and girls enjoying normal eyesight. All written work is done in the special room. Practically all oral work is performed in the regular grade room with the other children. For example, a fifth grade child does his written arithmetic, map work, reading, written composition, and writing with the special teacher. Oral arithmetic, geography, history, grammar, oral spelling, etc., are recited in the regular fifth grade room. This keeps the sight-saving class pupil in competition with those enjoying normal vision, and guards against the tendency to set special standards applicable only to special groups.

Pupils of such classes, upon leaving school, regard themselves not as graduates of the special class, but of the school in which the class is located. Such pupils meet the world with a confidence which a training in competition exclusively with handicapped classmates could not possibly inspire. Furthermore, the employer accepts without question the graduate of a regular public school whose standards are familiar to him, while the graduate



SIGHT-SAVING CLASS PUPILS READING FROM BOOKS IN LARGE TYPE

of a special class must assume the burden of proof, often in the face of actual prejudice.

■ The plan of coeducation of conservation-of-vision pupils with pupils having normal sight offers many complications, and requires the careful supervision of a school authority who will keep constantly before all concerned the fundamental principle that school methods should be so planned as best to train the pupil for the broader field of life.

The building selected for conservation-of-vision work should of course have good lighting conditions. The special room should be a model so far as eye-hygiene is concerned. The window-glass area should equal not less than one-fifth the floor area. In case of bilateral lighting, the walls containing windows should be adjacent. The light coming from the rear in such rooms should be of less intensity than that coming from the left; otherwise troublesome body shadows upon the desks may result. The more desirable directions of the source of light are, in order of preference, northeast, east, north and east, northwest, north and west. A southern exposure should be avoided because of the glare and fluctuation in the intensity of light in south rooms.

Windows should be provided with adjustable window shades which enable the teacher to exclude direct rays of the sun without darkening the entire window. When adjustable window shades are not used, the windows should be equipped with two shades, one at the top and one either at the bottom or at the top of the lower sash.

An adequate scientifically planned artificial lighting system is essential for use on cloudy days. Semi-indirect lighting usually gives the best results. The best lighted sight-saving classrooms are provided with from two and one half to three watts of electric light power per square foot of floor area.

Glare should be reduced to a minimum by refinishing the desks and all other woodwork with a mat surface. The walls should be decorated with a good neutral tint, preferably French gray, and should be done with calcimine or some other coating producing a dull finish. Adjacent buildings should be sufficiently distant to permit a good sky line. Five vertical degrees of sky should be



WRITTEN ARITHMETIC AS DONE IN THE SIGHT-SAVING CLASS

visible from every part of the room in which the children are required to work.

The blackboard is the most essential part of the equipment of such rooms. The room should be fitted with good slate boards and a plentiful supply of blackboard cloth and desk writing-boards.

The teacher of such a class should be under the constant advice of an eye specialist with whom she can counsel frequently regarding the ocular condition of each pupil. The amount of close work which any child may safely perform depends entirely upon the peculiar condition of his eyes. If any use at all is made of ordinary book print it should be upon the advice of the attending ophthalmologist. Most textbooks used in the conservation-of-vision classes are printed in a twenty-four point heavy type. An unglazed book stock paper, with a slightly buff tint, is employed.¹

Written work in these classes is done largely upon the blackboard. Certain pupils, however, are permitted to use a soft heavy pencil such as is commonly found in the first grade classrooms. The pencil work is done upon an unglazed manila paper, ruled at intervals of about an inch. The accompanying illustration shows a pupil working arithmetic problems upon such paper. He has drawn his movable desk up to the blackboard where he can see the problems which the teacher has placed on the board, and where he has very satisfactory light.

Pupils above the fourth grade are taught to write on the typewriter, using the touch method. This enables them to do much of their written work without any eye strain whatever. In the accompanying illustration the copy-holder containing the lesson for

¹ As sight-saving classes are still not very numerous, the demand for textbooks in large type is too small to make their production financially attractive to any commercial book-publishing concern. The need for such texts has been partially met by the Howe Publishing Society for the Blind, Old Court House, Cleveland, Ohio, which is a philanthropic organization interested primarily in printing books for the blind. This society has annually received orders from most of the cities conducting conservation-of-vision classes. By pooling this business it has been able to negotiate contracts with job printers and book binders for the publication at one time of the entire year's demand of the country. While the books which are sold by this organization at cost are still quite expensive, the cost of production is far lower than would be possible were each city to do its printing independently.



SIGHT-SAVING CLASS PUPIL PRACTISING TYPEWRITING

the day rests upon the floor and is independent of the typewriter stand. This eliminates the troublesome vibration inevitable when the copy-holder is attached either to the typewriter or to the table upon which the typewriter rests.

The ordinary maps, such as are found in the geography textbooks, and even wall maps contain so much detail and so much fine print that it is not safe to permit the sight-saving class pupil to make use of them. The outline maps which consist of lines drawn with paint upon slated cloth, showing the general political divisions, together with the rivers, coast lines, and other main physical features, are coming into general use in conservation-of-vision classes. On these maps it is possible to insert at will all necessary detail as needed. Such insertions may be erased and others made so that at all times the particular subject matter under consideration stands out clearly.

Much emphasis is placed upon hand training in the sight-saving classes. These pupils are taught to use their hands without looking closely at what they are doing. It is hoped in this way to relieve them of much habitual eye-strain in their everyday occupations.

The object of the sight-saving class would be but half attained were the teacher satisfied with enabling her pupils to do their school work with as little eye-strain as possible, and giving them thorough instruction in eye hygiene. The conservation of one's limited vision is not so much a matter of information as it is that of habit of life. This requires not only patient and persistent explanation and reiteration to the child, but also necessitates frequent visits to his home. It does little good for the teacher to copy the pupil's arithmetic in large script and to shield him from the evil effects of glare during the day, if by night he is permitted to attend the "movies" or to read the ordinary library books by the poor light usually available. A confidential and sympathetic relationship with the parents must be established and their intelligent coöperation enlisted. Then does the child's instruction in conservation-of-vision continue throughout all his waking hours.

In order to measure the results of sight-saving class work two criteria may be used: (1) To what extent have these classes

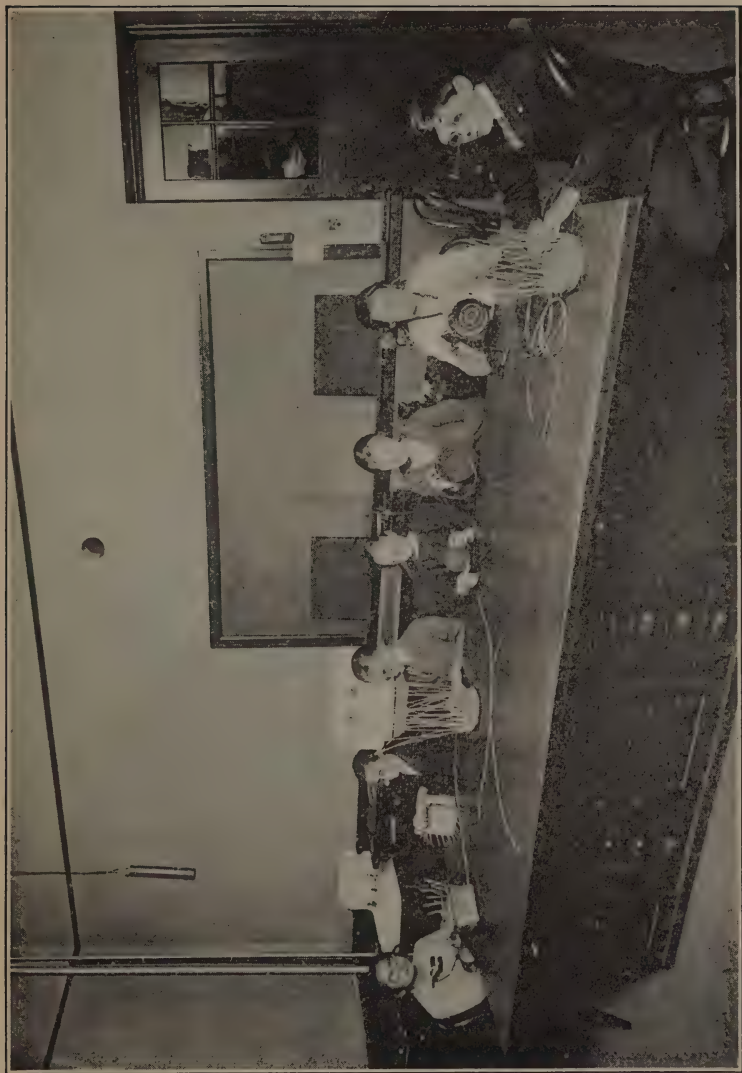


MAP STUDY IN THE SIGHT-SAVING CLASS

actually conserved vision? (2) How does the scholarship of the pupils in the sight-saving classes compare with their scholarship prior to assignment to such classes? No extensive statistical study has yet been made of the effect of sight-saving class work upon the eyes of the pupils. A study of a small group by Dr. Louis Stricker of Cincinnati, has indicated most gratifying results. From general observation it seems clear that by relieving these pupils of eye-strain during the period of their school course, deterioration has been almost universally checked. Eye specialists agree, however, that in most of the cases assigned to conservation-of-vision classes, little improvement in eye condition should be looked for. The most that we may hope is that these pupils will get through school with little or no reduction of vision. Persons thoroughly trained throughout their school life in the care of their eyes may be expected to conserve their vision after reaching mature years.

A study of the promotion records of 100 sight-saving class pupils in Cleveland shows a reduction of 85 per cent in the proportion of failures after the work in the sight-saving classes is well begun, as compared with the proportion of failures of these pupils prior to entrance in the sight-saving classes. The proportion of failures among the sight-saving class pupils is 60 per cent less than the proportion of failures in the entire public school system.

Having brought these children through school with little or no diminution of vision, and having taught them to conserve their limited sight, the responsibility still rests upon the school to place them in occupations where they can attain a maximum of efficiency with a minimum of eye-strain. In most places, sight-saving class pupils receive more or less aid in securing suitable employment after leaving school. Cleveland added to its sight-saving class department a few years ago a vocational guidance worker. Her duties are briefly: to study the older boys and girls with a view to determining their vocational interests and possibilities, and their social traits and characteristics; to suggest courses of study, and to visit the high school pupils in their classrooms, conferring with their teachers in regard to their work and



HAND TRAINING FORMS AN IMPORTANT PART OF SIGHT-SAVING CLASS WORK

tendencies; to become acquainted with the families of these children, and to take an active interest in their social life. All this is done with a view to learning just how the individual can become an efficient, self-supporting, respected member of his own community. Furthermore, the vocational guidance worker finds "odd jobs" for the boys and girls who must work while attending schools. She calls upon business and professional men and women, and welfare supervisors in stores and factories, in an effort to interest them in her charges as wage earners. The aim is not merely to find simple processes which persons with defective vision can perform, but to discover lines of occupation in which they can safely engage with a limited degree of vision. Such occupation should offer opportunities for advancement without injury to their eyes, general health, or morals. The vocational guidance worker's task does not end until each pupil is placed in the position for which he is best fitted by training and natural inclination, and is thus given a chance to prove himself socially and industrially a successful member of the community. When such persons are satisfactorily placed, the public school sight-saving class department has fulfilled its obligations. Thenceforth it is the duty of a publicly supported employment bureau to undertake this responsibility.

The spread of the sight-saving classes to the smaller cities has given an opportunity to compare the prevalence of defective eyesight in large and small places. In Cleveland there has been found one conservation-of-vision pupil to every thousand of the school population. The same ratio would seem to hold in Cincinnati. In Mansfield, Ashtabula, and Alliance, the ratio is about one to every five hundred of the school population. It is probable that this is a result of the special attention given to eyes by the medical inspection departments of our large cities.

Considering for a moment the future development of this form of special school activity it would seem that the sight-saving class movement has just begun. The surprising proportion of children with defective eyesight in the smaller cities would indicate that every city having a population of 20,000 or more is in need of a class of this kind.

Several attempts have been made by eye specialists to state in general terms the kinds and degrees of visual defect which indicate the need of some special school accommodation. Though the technical terms employed render these descriptions almost unintelligible to the layman, two of these statements are appended as they will be of some assistance to eye specialists in determining which of their patients should be referred to sight-saving classes.

Each individual applicant must, however, for the present be considered separately. As yet we can be certain only thus far: any child who has a defect of vision which makes it impossible, or inadvisable, for him to be instructed in the ordinary way should have some special school provision for his case. Any community which fails to do this must pay the price in dollars and cents for the loss of economic efficiency of certain of its citizens.

APPENDIX A

DESCRIPTION OF ELIGIBLE CANDIDATES TO SIGHT-SAVING CLASSES
PREPARED BY A COMMITTEE OF CINCINNATI EYE SPECIALISTS, OF
WHICH DR. LOUIS STRICKER WAS CHAIRMAN

1. Children who cannot read more than 6/21 at distance and who cannot read 2.00 at 20 c.m.
2. Myopes who have more than five diopters of myopia.
3. Hyperopes who have symptoms of asthenopia and who have more than five diopters of hyperopia.
4. Children who have an astigmatism of more than 3.5 diopters and whose vision cannot be brought up to more than 6/24.
5. Children with maculae, nebulae, leucomae, which interfere with sight and lead to eye-strain.

NOTE. It is assumed that these conditions exist after the proper refractions have been made.

DESCRIPTION OF CASES INDICATING SIGHT-SAVING CLASS TREATMENT
PREPARED BY DR. DOUGLAS F. WOOD, OF MINNEAPOLIS, AFTER SOME
STUDY OF THIS SUBJECT

1. Myopes of 8 diopters or more.
2. Myopes whose vision cannot be brought up to one-half normal vision: 6/12.
3. Progressive myopia.
4. Children having macula or leucoma of the cornea; or optic atrophy with vision less than 6/15.
5. Astigmatism with glasses 6/21 or less.
6. Hyperopia with more than eight diopters, with symptoms of asthenopia.
7. Keratitis. In the interstitial type, if the vision remains low after the eye has been quiet for three months, or in persistent recurrent conditions while under treatment.
8. In congenital cataracts, or secondary cataracts where no acute condition is present, vision 6/15 or less.
9. Congenital malformations, where the vision is 6/21 or less.
10. In all chronic diseases of the fundus, where the vision is 6/12 or less.

APPENDIX B

A classification of the eye conditions of 181 Ohio pupils whose eye histories are available is arranged in the accompanying table. This distribution of cases will be of interest to any oculist investigating the subject of sight-saving classes, as it shows the actual proportion of various kinds of eye defects prevalent among the pupils now attending schools in the cities from which this material has been selected. The percentage of myopic cases is lower than we should expect to discover. It is probable that this fact is attributable to an undue conservatism among eye specialists in assigning to sight-saving classes extremely near-sighted pupils whose degree of vision can be brought up to near normal with glasses. The reluctance of oculists to assign such cases to sight-saving classes grows out of the difficulty of convincing the parents of the need of relieving the child of all eye-strain, in spite of the fact that with glasses he seems to see well and suffers no pain. Sight-saving classes would be able much more thoroughly to fulfil their function in the community if eye specialists would assign to these classes all cases of short-sight which they may be reasonably confident will become progressively worse when subjected to the strain which regular school work entails.

CLASSIFICATION OF DIAGNOSES OF EYE CONDITIONS OF 181 SIGHT-SAVING
CLASS PUPILS IN OHIO

Eye Diagnoses	Number of Pupils	Per cent
Albino.....	3	1.6
Astigmatism.....	48	26.5
Hyperopic Astigmatism.....	28	
Myopic Astigmatism.....	10	
Mixed Astigmatism.....	10	
	<u>48</u>	
Buphthalmos (protrusion of the cornea).....	1	.5
Cataracts (an opaque formation in the crystalline lens)...	20	11.0
Choroiditis (inflammation of the choroid, or coat of the eye containing most of the blood vessels).....	9	4.9
Congenital Malformation (imperfect development of retina).....	1	.5
Corneal Scars.....	21	11.6
Ectopialentis (dislocation of the crystalline lens).....	3	1.6
Glaucoma.....	1	.5
Hyperopia (far-sight).....	5	2.7
Interstitial Keratitis (an inflammation of the cornea)....	12	6.6
Myopia (near-sight).....	28	15.4
Nystagmus (a condition in which the eye is continually moving).....	19	10.5
Optic Atrophy (paralysis of the optic nerve).....	6	3.3
Retinitis (inflammation of the retina).....	4	2.2
Retinitis pigmentosa.....	2	
Choroid retinitis.....	2	
	<u>4</u>	

DISTRIBUTION OF DEGREE OF VISION POSSESSED BY 181 SIGHT-SAVING
CLASS PUPILS IN OHIO

Degree of Vision	Number of Pupils	Per cent
5/60.....	6	3.3
6/60.....	32	17.6
6/9.....	4 (myopes)	2.2
6/21.....	25	13.8
6/15.....	17	9.4
6/12.....	7 (myopes)	3.8
6/30.....	25	13.8
6/24.....	24	13.2
6/18.....	14	7.7
6/36.....	26	14.3
4/60.....	1	.5

NOTE. In determining the degree of vision the test card is usually placed at 6 meters (20 feet) from the patient, and he is asked to read all of the lines on the card visible to him at that distance. The top line should be visible to a patient

having normal sight at a distance of 60 meters (about 200 feet); the second line should be visible at 30 meters (about 100 feet); the fifth line should be visible at 12 meters (about 40 feet); the sixth line should be visible at 6 meters (about 20 feet). The degree of vision of a patient who can read the top line only is expressed as 6/60 vision, signifying that he can read at 6 meters what he should be able to read at 60 meters. The degree of vision of a patient reading only the first five lines is expressed as 6/12 vision, meaning that he can read at 6 meters what he should be able to read at 12 meters. A person having normal vision can read the sixth line at 6 meters. His degree of vision is expressed as 6/6. Patients who cannot read the top line at 6 meters are frequently allowed to approach the card until this line becomes legible; for example, a person who must approach to within 5 meters of the test card is said to have 5/60 vision, those who must approach to within 4 meters are said to have 4/60 vision.

APPENDIX C

BIBLIOGRAPHY

- Report of Minnesota School for the Blind, 1910, p. 33.
 Report of Boston School Committee, 1913, p. 54; 1914, p. 32.
 Report of the Superintendent of Schools of Cleveland, 1913-14, p. 42.
 Report of Pennsylvania Institution for the Blind, 1914, p. 34; 1916, p. 109.
 Report of Massachusetts Commission for the Blind, 1914, p. 70; 1916, pp. 16-49; 1916, p. 63.
 Report of United States Commissioner of Education, 1915, vol. i, p. 507.
 Report of Cincinnati Board of Education, 1916, p. 255.
 Report of Superintendent of Schools of Boston, 1917, p. 90.
 Cincinnati Board of Health Bulletin, September 18, 1915.
 Monthly Bulletin of Department of Health, City of New York, vol. ix, September, 1919, p. 220.
 Archives of Ophthalmology, vol. xlv, 1913, p. 186.
 Ohio State Medical Journal, vol. xiii, 1917, p. 813; vol. xiv, 1918, p. 81.
 American Journal of Public Health, vol. vii, 1917, p. 782.
 Cleveland Medical Journal, vol. xvii, 1918, p. 245.
 Modern Medicine, July, 1918, vol. i, No. 3, pp. 257-264.
 W. C. Posey, "Hygiene of the Eye," 1918, p. 95.
 Proceedings of the American Association of Instructors of the Blind, 1916, pp. 12-88; 1918, pp. 58, 59, 60.
 Boston Transcript, May 20, 1916.
 Ohio Teacher, vol. xxxviii, 1916, p. 32.
 Outlook for the Blind, vol. x, 1916, p. 9; vol. xii, 1918, pp. 67-71.
 Cleveland Society for the Blind, "The Blind in Cleveland," 1918, p. 42.
 Louis Stricker, "Blindness in Hamilton County," 1918, pp. 66-91.
 Publication of the National Committee for the Prevention of Blindness, No. 18, "Manual for Conservation of Vision Classes," by Winifred Hathaway, November, 1919.

Attention is especially called to the "Manual for Conservation of Vision Classes," which should be in the hands of every sight-saving class teacher.

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